21 Job Planner

The primary purpose is to assist in the design and assembly of perforating strings and help the user execute perforating and TCP jobs. For TCP jobs, the end result will be an inventory of all the items required to complete your TCP string. For wireline jobs, you will have a list of all the runs you plan on making and the design of each tool string that goes in the hole. For either type of job, you build every gun to your specifications, and then add all the other components required to complete the tool string.

21.1 TCP Jobs

For TCP, the job table will be the inventory list of all the items that will go in the hole.

21.2 Wireline Jobs

FIG: 21.1 Job Plan

For Wireline jobs, the job table will be a list of all depth intervals that you will be dealing with during your job. One line in the job table will indicate either a depth to be perforated or a depth to set a plug or a depth to cut casing.

Each job consists of 1 or more Runs. Each Run contains 1 or more Intervals. Each run has a Base Service. The Base Service is what service will be run in the hole that will be attached to the gun, plug, whatever. Each interval consists of either a single depth or a single depth range (top depth - bottom depth). A run may contain more that 1 interval if the string contains a select fire assembly, or is a core gun, or is any other combination of devices that can be activated over more that one depth or depth range. The other

possibility is that you may have more than one interval that will be part of one gun. If you have to perforate from 5000-5002 and 5008-5010, then that may be achieved with 1 10' carrier but will still have to be entered as 2 intervals. The program will verify with the user if two intervals can be placed in the same carrier and that will be shown in the Job table by two intervals with the same serial number. Serial numbers of guns will be generated by the system and not editable by the user.

One interval takes up one line in the Job table. An interval consists of a single depth or a single depth range (top depth - bottom depth). An interval must be associated with a run name and a base service and also must consist of some type of device.

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21.2.1 Tools Inventory:

Since the purpose of this is to design perforating and TCP jobs, to start you need to make entries for all the equipment you will run in the hole using the Tools Editor. This includes gun subs, sinker bars, tandem subs, setting tools, firing heads, etc. Some items you may want to create as non-serial items so you can add as many to a tool string as you need. In order for this to properly calculate offsets and tool string lengths, all items that go in the hole that modify the length of the tool string need to be added to the tool string through the tool string editor. For example, if you choose a 10' carrier for a perforating job, that carrier will automatically be added to the bottom of the service you have chosen. But you will have to add the top and bottom gun subs to the tool string through the tool string editor.

21.2.2 Perforating Inventory:

From the job plan module, you can create the gun types that you use. From job plan menu select Job->Wizard, and then go to the Build guns tab. From there you can create your gun types and charge types that you use. Right click on the Gun Type, and then select New Item or New Category. Each gun type can have 0 or more categories and each category can have 0 or more items associated with it. Categories are optional. For each item you create, you will see a picture on the right side. Just click on the item you want to edit. When you are done, select **Save** gun type. Now when you go to creating a perforating job, you will select from your inventory and the gun will automatically be filled in with the requested shot length. You will be warned if the requested shot length does not fit in the gun you selected.

21.3 Getting Started

There are two types of inventory you will need to do in order to take full advantage of the job plan module.

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21.4 Job Wizard

Use the Job Wizard to complete the information for your job. You will have 4 pages (tabs) of information to fill out. The first 3 tabs will be the same whether you are doing a TCP job or a Wireline job.
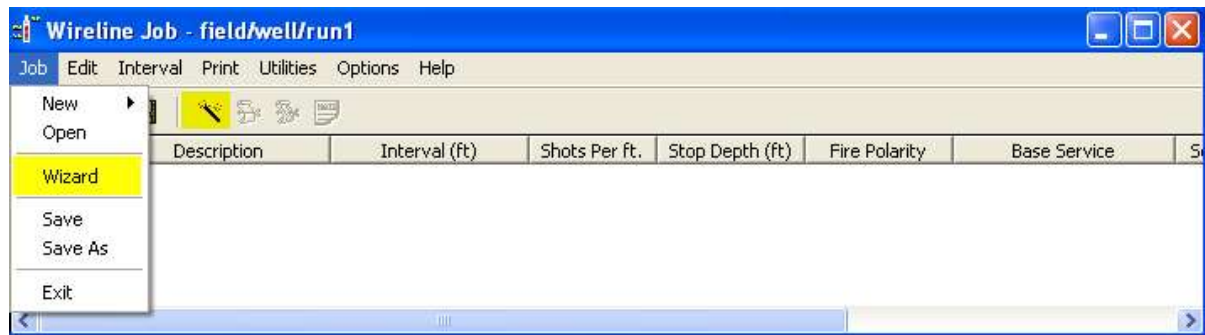

FIG: 21.2 Job Wizard

21.4.1   Job information

You can enter the database name of the correlation log here. If you have a correlation log entered here, when you set your results, a well object will be added to this pass indicating the completion of that interval. All of the other information is for reference use only.
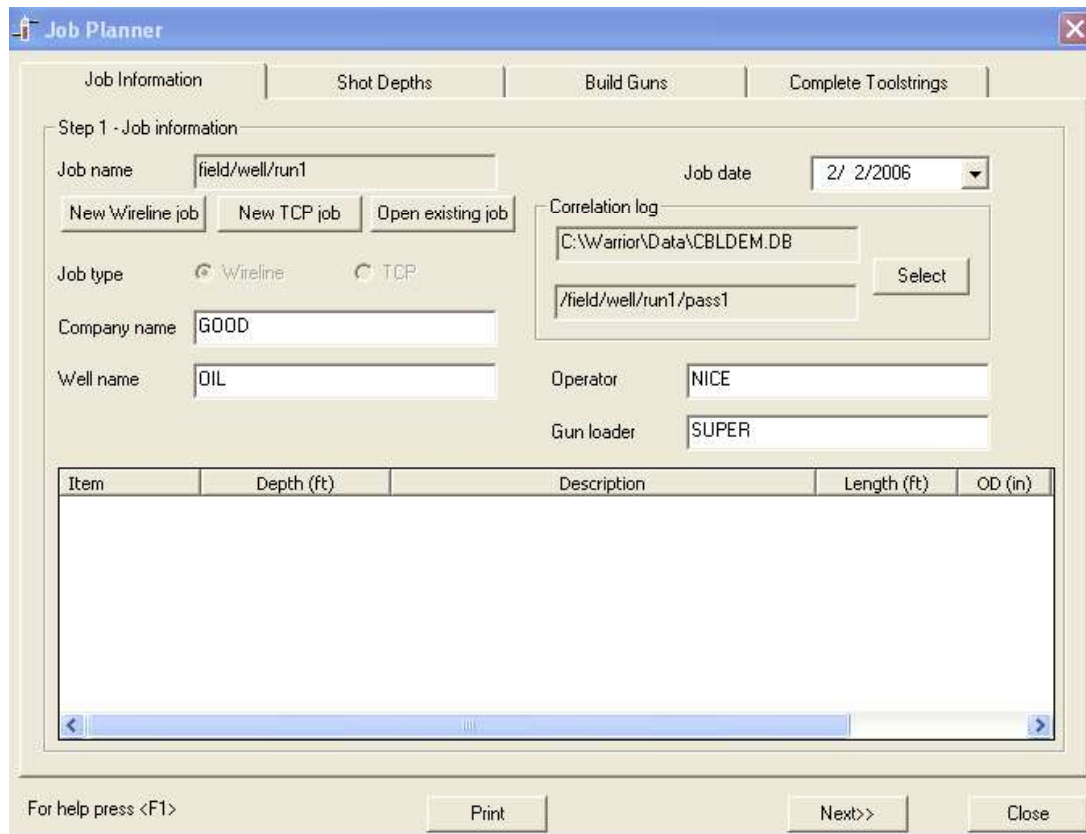
FIG: 21.3 Job Planner

21.5 Shot Depths

Enter your shot depth information here. Fill in the job table with shot depths or select an item from the list to edit. To enter a new interval, if the button says Update interval, press the Clear selection button. Then type in your new depths and select the Add interval button.

FIG: 21.4 Job Planner

21.6 Build Guns

Now that you have intervals in your table, you need to assign a gun type to your depth interval. If you have no gun types in your list, then you have to create new ones (see Gun types below). To assign a gun type, first select the interval from the list of intervals, and then choose the gun type from the list of gun types. If you want more than one interval to fit in one gun, then select more than one interval by using <ctrl> left click. If the intervals can fit in one gun, then a message will pop up reminding you that more than one interval has been assigned to a gun. Otherwise the same gun will be assigned to each of the selected intervals. You should see your gun in the picture on the right. The parameters that show up (length, top shot, etc.) are the ones that you assigned to that gun type. You can edit any of those parameters to change them for this gun by clicking on any of the values and typing in new values.

The gun will be loaded by default starting at the top of the gun. To change where the loaded interval starts, click in the loaded area of the gun (where the red dots are) and slide the loaded interval up or down. The distance to the top shot and bottom shot will change as you slide the loaded interval. The distance to the top shot can be no less than the top loadable number and the distance to the bottom shot can be no more than the bottom loadable number.

When you are viewing the design of a gun with no interval assigned to it, the shots will be indicated in black. When you are viewing a gun that does have an interval assigned to it, the interval will be displayed in the upper left part of the diagram and the loaded interval will be indicated by red shots.

You can print a picture of the gun from here to give to the gun loader.
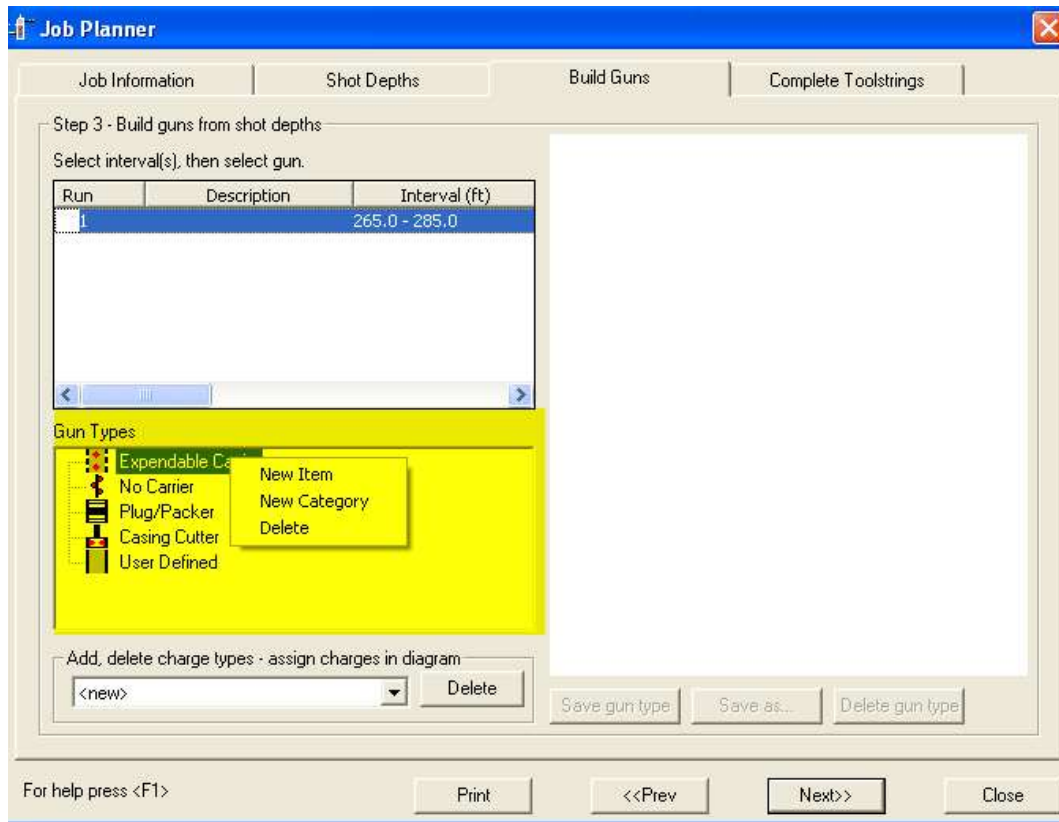
21.6.1 Gun types

FIG: 21.5 Gun Types

FIG: 21.6 New Item

There are several predefined gun types or you can add your own gun type. Your own gun type will require a metafile picture to go with it. To add new items, right click on the Gun type and then select New Item, New Category, or Delete. For each type of gun, you can have 0 or more categories, and then for each category you can have 0 or more items. You can drag and drop items and categories within their gun type if you want to organize things differently. All of the gun and charge type information goes in the file explobjs.ini so once you have all the standard gun information entered; you can pass out copies of this file. Once you have a new gun showing in the window on the right, you can edit any of the parameters for the gun. All entries are edited by clicking on the value to be edited and then typing in a new value. The following entries are critical to having the gun diagrams and shot calculations come out properly. The Total length value is the total length of the item without any gun subs. The Top shot value is the distance from the top of the gun body to the top shot. The Shot length is the maximum shot length that this type of gun can be loaded. All of the parameters can be edited for a specific gun once you assign this gun to an interval in case you have a carrier that is slightly different from the generic gun type you created.
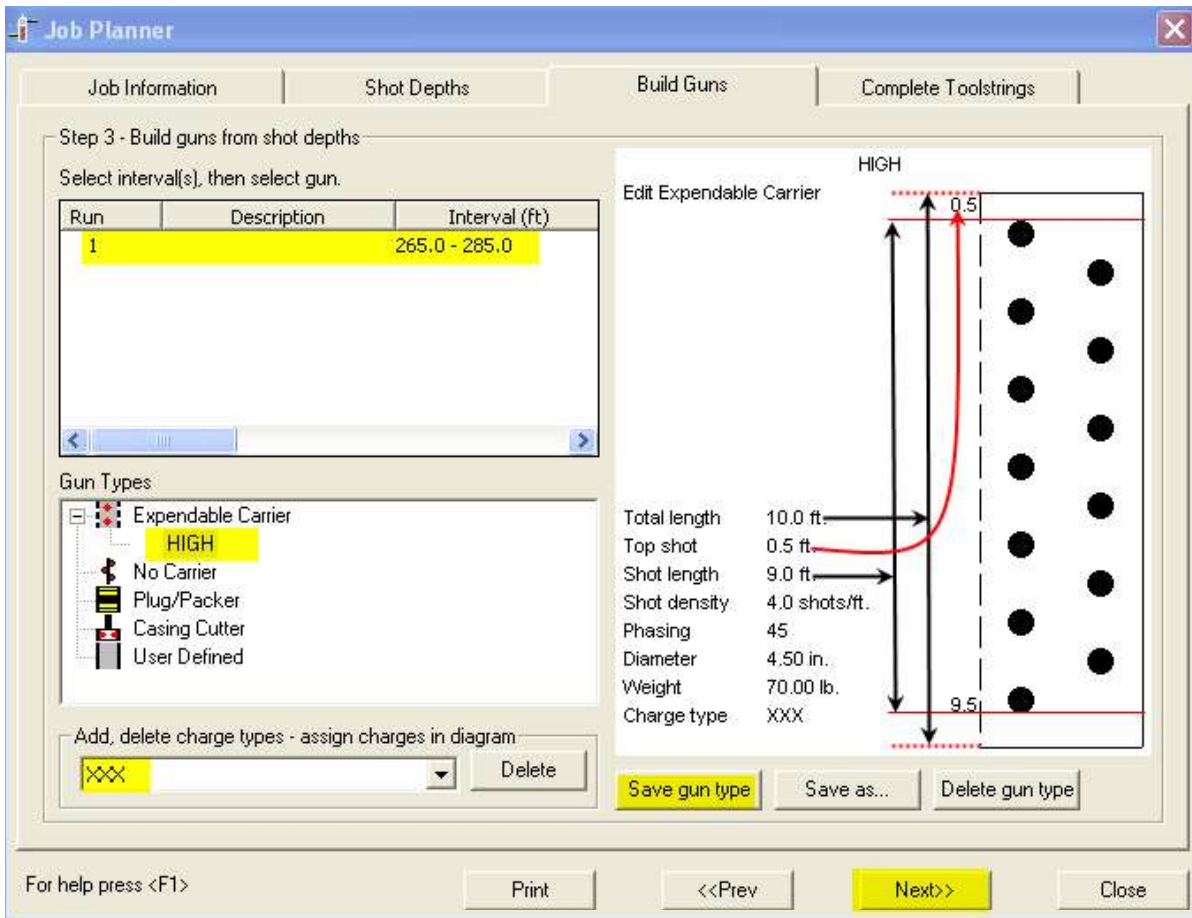
FIG: 21.7 New Gun Type

21.6.2   Charge types

All of the charges that you create in this list will show up in the list of charge types that you can choose from when you edit your gun parameters from your gun picture on the right.
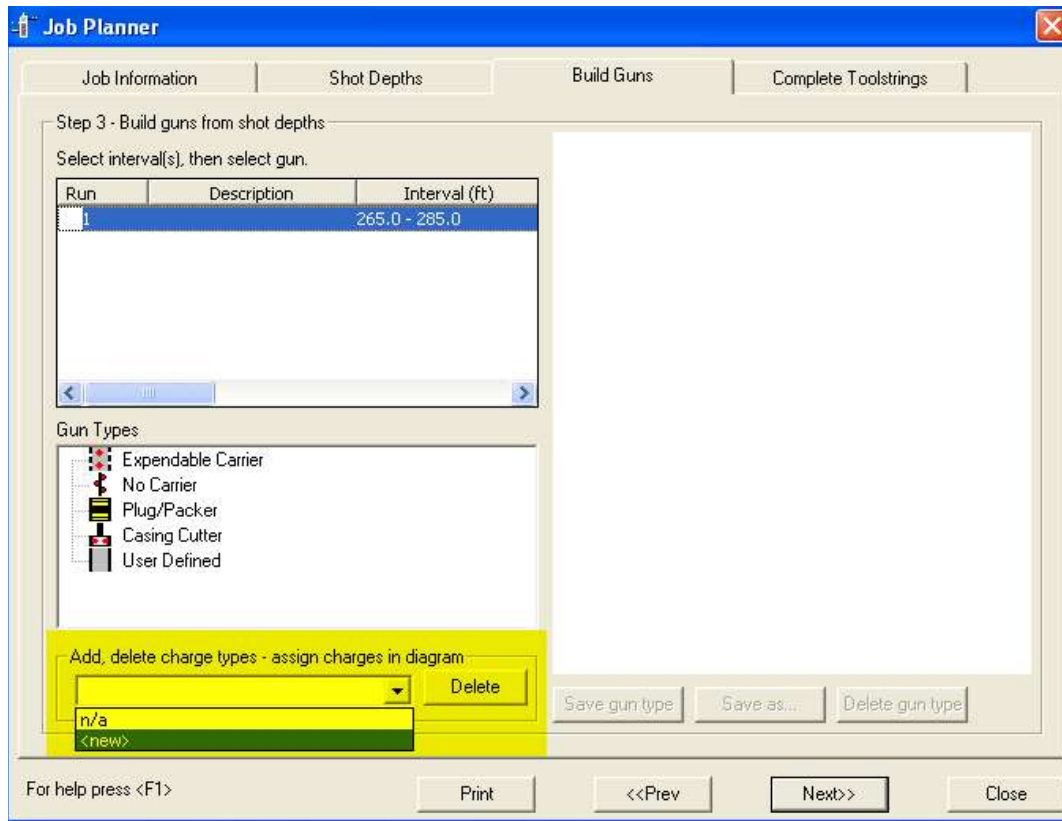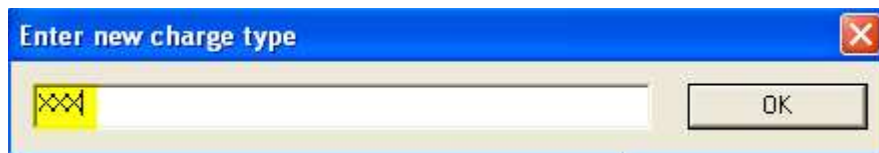
FIG: 21.8 Add New Charge

FIG: 21.9 New Charge

21.7 Build TCP string

Selected TCP for the job type, then you will see this tab. The TCP job is centered around the gun shot depth, so as you add items to the string, their depth will be calculated based on the gun shot depth. To find items to add to the TCP string, select the Edit TCP string button. This will bring up the tool string editor and allow you to add and remove items from your TCP string. It is up to the user to add any gun subs to the carrier to make the diagram complete. If you have more than one gun in the TCP string, the depths will be referenced off of the top gun. You will have to fill in items below the top gun to get the rest of the guns on depth or you will get a warning message. When you are completed with your TCP string, and then select the Finish button.

21.7.1   Off Depth Warning:
If you have more than one gun in the TCP string, then you may get a warning message that displays how far off depth the gun is. The depth value is the amount of space you need to add above that gun to make it

come out on depth. If it is negative, then you have too much space above the gun. From the Build TCP String tab, you can modify that amount by changing the value TCP Depths must be within. The default is 0.25 ft.

21.8 Build Tool Strings

Selected Wireline for the job type, then you will see this tab. The first thing you have to do is assign a service to one or more intervals. From the services editor, there is an option for every service **– "Make this service available for perforating".** Only the services that have this option checked will show up as services you can assign to a perforating interval.

Select one or more intervals from the list that will be run in the hole on one tool string. Say you have 10 intervals in the list. You may have two intervals that you will perforate with one run in the hole - either with select fire or because they both fit on one gun. Once you have those items selected, then choose a service from the list of services at the bottom of the screen and then select the Assign Service button. The tool string editor will start up with those selected guns in the tool string as well as the tools from the service you selected. It is up to you to add your gun subs and any other items to make this match what you are running in the hole. When completed, select the Finish button.
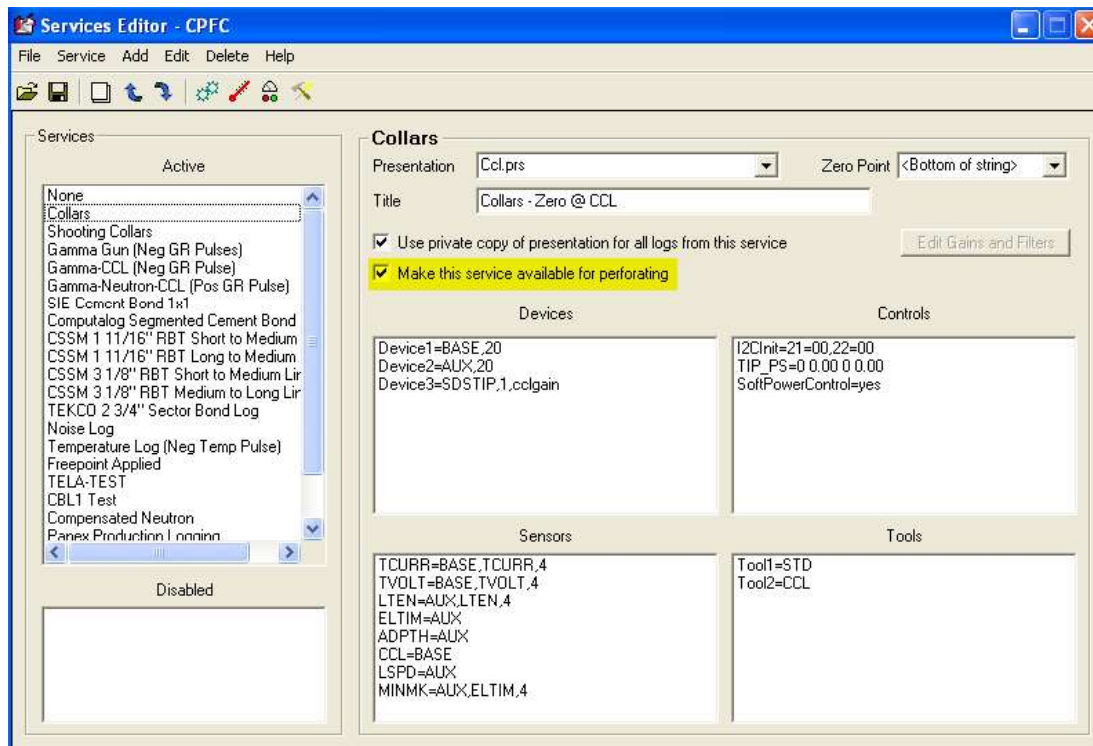

FIG: 21.10 Service editor

21.9 Main Window

21.9.1   Job menu
Saving a Job: The following information will be saved with each job:

21.10   The job plan itself

- /f/w/r/_jobplan_/_job_/1

The results of the job

- /f/w/r/_jobplan_/_report_/1

Each tool diagram

- /f/w/r/_jobplan_/_wtd_/[name]

The TCP diagram (for TCP jobs)

- /f/w/r/_jobplan_/_tcp_/1

21.11 Utilities

Insert a Well Object into a Log: Will create a well object in the run you have chosen. The tool diagrams will be saved in the database also, so you can re create the picture.

21.11.1 Import/Export
The loaded job can be exported to a floppy disk to be imported on another machine.   The floppy will contain one file with the job information as well as tool diagram files for the guns. Note that every gun has a serial number assigned to it. When the job is imported to another machine, those gun serial numbers may already exist, so the imported serial numbers may be reassigned to prevent conflicts.
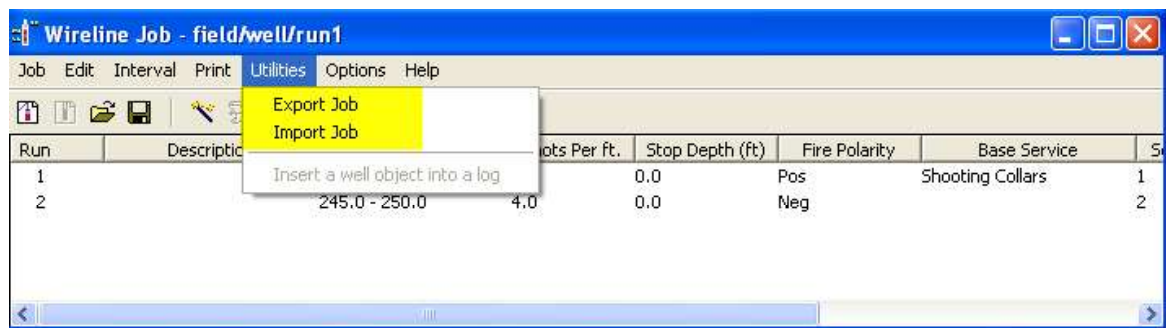

FIG: 21.11 Utilities Charge

21.11.2 Changing order of runs
Let's say you have 2 different runs created. Then you decide you want to have run 5 be the first run. Click on run 2 and drag it up above run 1 and drop it. You will be asked "Move run 5 before run 1?".   The run numbers will be rearranged; run 5 will be called run 1, run 1 will be called run 2, etc. The renumbering will always start at 1.
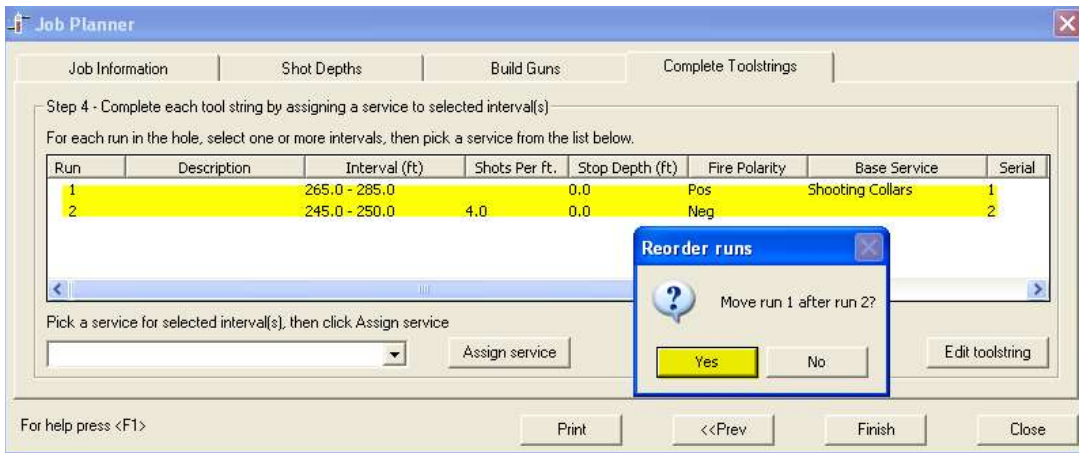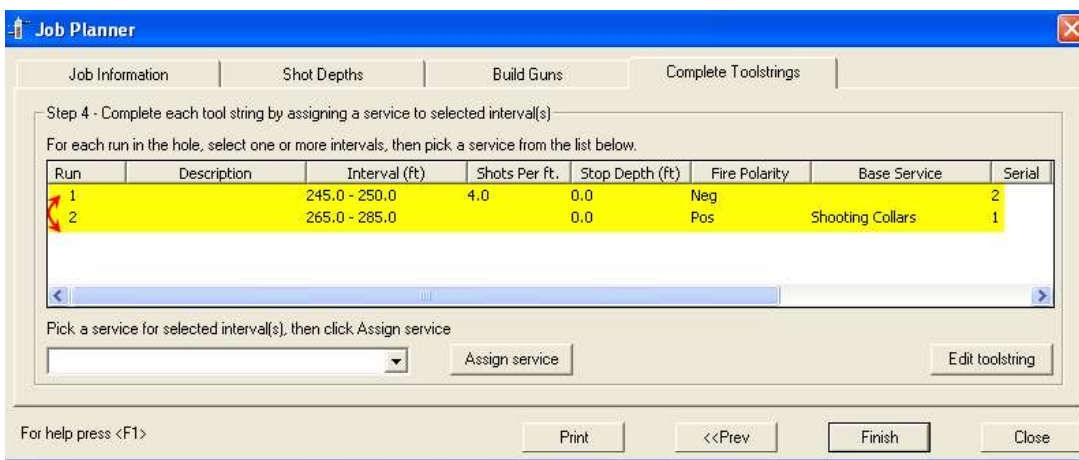
FIG: 21.12 Reorder Runs

FIG: 21.13 Job Planer swap Runs

21.11.3 Running a wireline job

Now that you have built a custom service for each run in the hole, you will control the service that is loaded from Job Plan. Right-click the run you are making from the list of runs and select Load Service. That will start Acquisition with the selected run. Make sure the tool diagram matches what is going in the hole, including gun subs. If this does not match exactly, then your Stop Depths will not be calculated correctly. When you close the tool diagram window, the Stop Depth will be updated, indicating the depth to stop the hoist to make the perforation. If you have made a previous run with this service, then Acquisition should load with the next free pass as the Dataset.

In the Depth Configuration screen, there is a "Stop Depth" setting that you can use to indicate when your logging depth is close enough to perforate.

21.12   Active interval

You will also notice there is an Active Interval choice below Load Service. Since a single run in the hole can have more than one interval associated with it, you can choose the interval within the loaded service you want to be active. If you only have one interval within the run, then that interval will be active. The active interval will change the color of the depth to green when the hoist depth is at the active interval stop depth. Also, the active interval will have an icon next to the run indicating it is active.

21.12.1 Results

Once you have completed one interval, right click on the interval and select Results. Your interval will show a different icon dependent upon what choice you make for your results. You can also add a text string to go with your results. You must at least choose one of the options (Successful, Unknown, Missfire) so you can keep track of the runs you have made already. If you choose Successful, then it will automatically add a perforating or plug well object to the log pass. If you have a correlation log entry in your Job Information screen, then the well object will be added to that log pass. Else the well object will be added to the current log pass.
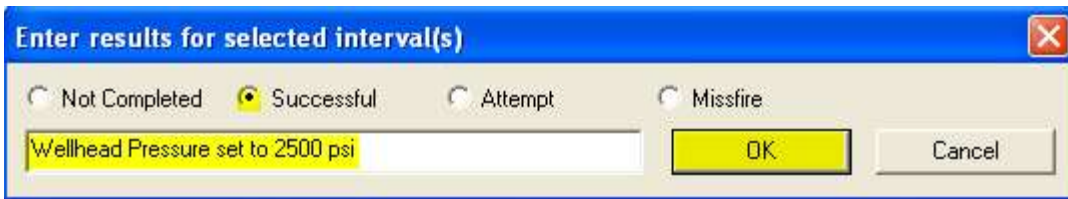
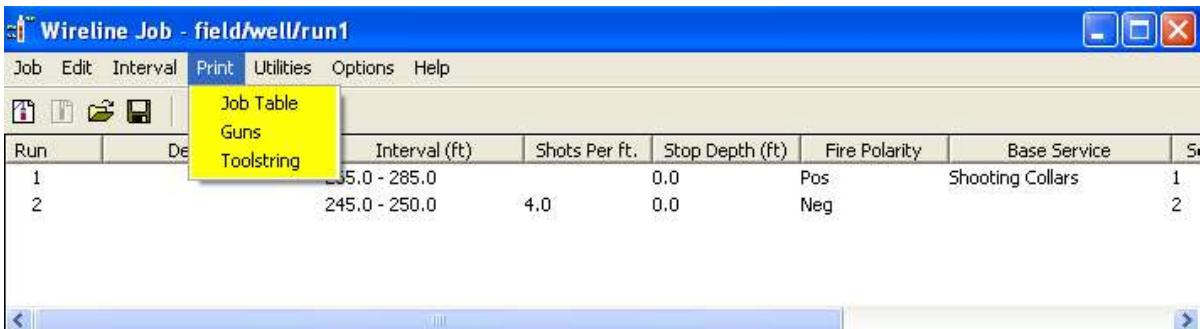FIG: 21.14 Results

FIG: 21.15 Comments

FIG: 21.16 Job Status

21.13   Print

FIG: 21.17 Print options

Select the option to print.